MULTIMEDIA UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019 SESSION

TSE3251/TSV3561 – SOFTWARE VERIFICATION & VALIDATION

(All sections / Groups)

2 MARCH 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 4 pages with 5 Questions only.

2. Attempt all **FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

Question 1

a. Based on the example below, explain why software testing cannot be exhaustive. [3 Marks]

A program takes in a value with eight (8) alpha numeric characters as input. The alpha characters can range from a – z, A – Z and numeric ranges from 0 - 9. It is assumed that every character or number can be repeated eight times.

b. One of the test closure activities is to analyse and document "lessons learned" for later projects and to improve test maturity. Determine two items that could be considered as "lessons" to be "learned" under this test closure activity. [2 Marks]

c. Differentiate between software verification, validation and the different test levels based on the V-model [Hint: illustrate with a diagram]. [5 Marks]

Question 2

a. Based on diagram 1 as shown below that displays the hierarchy of modules of a system, elaborate how you can carry out:

i) Top-down integration testing [1.5 Marks]

ii) Bottom-up integration testing [1.5 Marks]

Continued .....

iii) Indicate which modules would be the drivers and stubs for i) and ii) above.
[1 Mark]

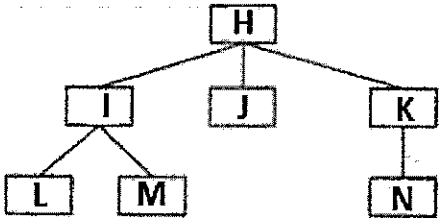

Diagram 1 - Hierarchy of Modules

b. Review is a static testing technique which could be informal or formal. Formal review follows a process which normally has six (6) basic steps. Determine these steps and indicate the main activities involved in each step. [6 Marks]

Question 3

a. A program takes in an input which is the temperature of a heating device in whole degree. Depending on the input, the program then checks if the heating device is in the "off" or "on" state. If the temperature falls below 18 degrees, the heating device is switched off. It is switched on again when the temperature reaches 21 degrees.

i) Determine three valid equivalence partitions for the temperature and indicate which state the heating device is at for each equivalence partition.
[3 Marks]

ii) Determine boundary values for the temperature to be at the "off" and "on" state.
[1 Mark]

Continued .....

b. Based on the following decision table, Table 1, create valid test cases for each rule with specific test data. [4 Marks]
[Hint: one valid test case for each rule 1-4]

Table 1

	Rule 1	**Rule 2**	**Rule 3**	**Rule 4**
Conditions				
Age	<21 years	21-29 years	30-50 years	>50 years
Insurance Class	A	A or B	B, C or D	C or D
Actions				
Premium	RM100	RM90	RM70	RM50
Excess	RM2,500	RM2,000	RM500	RM1000

c. Differentiate between dynamic black-box and dynamic white-box testing. [2 Marks]

Question 4

a. Transform the program fragment below to a flow graph. [3 Marks]

1. DiscountRate=1;
2. Fare = 1000;
3. If ((person == "senior citizen") and ("travel month = January"))
4. Bonuspoints = 100+Bonuspoints
5. If (class=="first")
6. DiscountRate =0.5;
7. Fare = Fare * DiscountRate;

Continued .....

b. Based on the flow graph from (a) above, determine:

i) The path that would provide 100% statement coverage [1 Mark]

ii) The path(s) that would provide 100% branch coverage [2 Marks]

c. One of the attributes that determines a good test case is "valid". This means the test case should detect real failures. List and explain four (4) other attributes that determine a good test case. [4 Marks]

Question 5

a. Justify the following statement in terms of failure costs. [2 Marks]

"Not-to-test can be expensive"

b. For test progress monitoring, it is important to gather test metrics. One test metrics which is frequently collected is defect-based metrics. Identify two (2) examples of defect-based metrics. [2 Marks]

c. When a user reports an incident, it is usually logged into a tracking system where its status could be traced. Illustrate with a diagram, the various status of the incident from it is first entered into the tracking system until the incident is resolved. [3 Marks]

d. Most often, manual testing is not enough to improve the quality of the software. In such case, test automation is required. Identify three (3) types of automated testing tools in order to raise the quality level of the software. [3 Marks]
[Hint: your answer should indicate the tool is to solve which quality issue]

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